Message

From: Anderson, Danielle [Anderson.Danielle@epa.gov]
Sent: 10/6/2020 6:07:20 PM
To: Sengco, Mario [Sengco.Mario@epa.gov]
Subject: RE: A couple of questions re: North Dakota's hardness-dependent criteria

Hi! Shari recommends you forward this to John Healy and Karen Kesler and see if either can help weigh in. Start there =)

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T: 202-564-1631
MC 4305T

From: Wirick, Holiday <wirick.holiday@epa.gov>
Sent: Tuesday, October 6, 2020 1:44 PM
To: Sengco, Mario <Sengco.Mario@epa.gov>
Cc: Anderson, Danielle <Anderson.Danielle@epa.gov>
Subject: A couple of questions re: North Dakota's hardness-dependent criteria

Hi Mario and Danielle, I hope you are doing well!

One of my questions is must freshwater conversion factors be used when calculating hardness-dependent criteria?

Below is an excerpt of ND's WQC table from the state's proposed WQS revisions. The state proposes to revise the hardness dependent criteria from 100 mg/L to 400 mg/L to reflect the hardness of the state's waters. They have 20 years of lentic and lotic systems data to support the revision.

When I plugged in ND's criteria for the metals revised below in EPA's 304(a) metals calculator spreadsheet that Erica and you sent me, the criteria were lower (in some cases significantly) when using the freshwater conversion factors. I'm just not clear on when one must use the conversion factors.

My other question is what "justification," if any, does ND need to provide in its WQS when changing its hardness-dependent criteria from 100 mg/L to 400 mg/L? Should the state provide a description of background conditions citing the 20 years of data to support the revision?

Thanks so much for your help with these questions!

		Aquatic Life Value Classes I, IA, II, III		Human Health Value	
				Classes I, IA, II[2]	Class III[3]
7440-36-0	Antimony			5.6	640
7440-38-2	Arsenic[7]	340[9]	150[9]	10[7]	

7440-41-7	Beryllium[4]			4[7]	
7440-43-9	Cadmium	~~1.87~~ 38[6,15]	~~0.722~~ 39[6,15]	5[7]	
16065-83-1	Chromium (III)	~~1,805~~,611.70[6,15]	~~86~~268.22[6,15]	100(total)[7]	
18540-29-9	Chromium (VI)	16	11	100(total)[7]	
7440-50-8	Copper	~~14.05~~1.68[6,15,16]	~~9.33~~0.50[6,15,16]	1000	
7782-41-4	Fluoride			4,000[7]	
7439-92-1	Lead	~~81.82~~476.82[6]	~~3.2~~ 18.58[6]	15[7]	
7439-97-6	Mercury	1.7	~~0.012~~ 0.88	0.050	0.051
7440-02-0	Nickel	~~470~~1,516.92[6,15]	~~52~~168.54[6,15]	100[7]	4,200
7782-49-2	Selenium	20	5	50[7]	
7440-22-4	Silver	~~3.8~~41.07[6,15]			
7440-28-0	Thallium			0.24	0.47
7440-61-1	Uranium			30[7]	
7440-66-6	Zinc	~~120~~387.83[6,15]	~~120~~387.82[6,15]	7,400	26,000

Exceptfor the aquatic life values for metals,the values given in this appendix refer to the total (dissolved plus suspended) amount of each substance. For the aquatic life valuesfor metals, the values refer to the total recoverable method for ambient metals analyses.

2 Based on two routes of exposure - ingestion of contaminated aquatic organisms and drinking water.

3 Based on one route of exposure - ingestion of contaminated aquatic organisms only.

4 Substance classified as a carcinogen, with the value based on an incremental risk of one additional instance of cancer in one million persons.

5 Chemicals whichare not individually classified as carcinogens, but which are contained within a class of chemicals, with carcinogenicity as the basis for the criteria derivation for that class of chemicals; anindividual carcinogenicity assessment for these chemicals is pending.

6 Hardness dependent criteria. Value given is an example only and is based on a $CaCO_3$ hardness of ~~100~~ 400 mg/l. Criteriaforeach case must be calculated using thefollowing formula:

For the Criterion Maximum Concentration (CMC):

Cadmium $CMC = e^{0.9789[\ln(\text{hardness})]-3.866}$ Chromium (III) $CMC = e^{0.8190[\ln(\text{hardness})] + 3.7256}$

Copper $CMC = e^{0.9422[\ln(\text{hardness})] - 1.7000}$

Lead $CMC = e^{1.2730[\ln(\text{hardness})] - 1.4600}$

Nickel $CMC = e^{0.8460[\ln(\text{hardness})] + 2.2550}$

Silver $CMC = e^{1.7200[\ln(\text{hardness})] - 6.5900}$

Zinc $CMC = e^{0.8473[\ln(\text{hardness})] + 0.8840}$

CMC = Criterion Maximum Concentration (acute exposure value)

The threshold value at or below whichthere should be no unacceptable effects to freshwater aquatic organisms and

their uses if the one-hour concentration does not exceedthat CMC value more than once every three years on the average.

For the Criterion Continuous Concentration (CCC):

Cadmium $CCC = e^{0.7977[\ln(\text{hardness})]-3.909}$ Chromium (III) $CCC = e^{0.8190[\ln(\text{hardness})] + 0.6848}$

Copper $CCC = e^{0.8545[\ln(\text{hardness})] - 1.7020}$

Lead $CCC = e^{1.2730[\ln(\text{hardness})] - 4.7050}$

Nickel $CCC = e^{0.8460[\ln(\text{hardness})] + 0.0584}$

Silver No CCC criterion for silver

Zinc $CCC = e^{0.8473[\ln(\text{hardness})] + 0.8840}$

CCC = Criterion Continuous Concentration (chronic exposure value)

The threshold value at or below whichthere should be no unacceptable effects to freshwater aquatic organisms and their uses if the four-day concentration does not exceedthat CCC value morethan once every three years on the average.

From: Wirick, Holiday <wirick.holiday@epa.gov>
Sent: Tuesday, October 6, 2020 11:10 AM
To: Sengco, Mario <Sengco.Mario@epa.gov>
Subject: Re: North Dakota's hardness-dependent criteria

Can I call you? Much easier and quicker to explain...

From: Sengco, Mario <Sengco.Mario@epa.gov>
Sent: Tuesday, October 6, 2020 11:06 AM
To: Wirick, Holiday <wirick.holiday@epa.gov>
Subject: RE: North Dakota's hardness-dependent criteria

Any pollutant or pollutants in particular?

From: Wirick, Holiday <wirick.holiday@epa.gov>
Sent: Tuesday, October 06, 2020 12:46 PM
To: Sengco, Mario <Sengco.Mario@epa.gov>
Subject: North Dakota's hardness-dependent criteria

Hi Mario, do you know who at HQ I can talk to about questions I have about hardness-dependent criteria?

Thanks,
Holly